

GENERAL INSTITUTE  
OF POLAR STUDIES

# Polar Bear

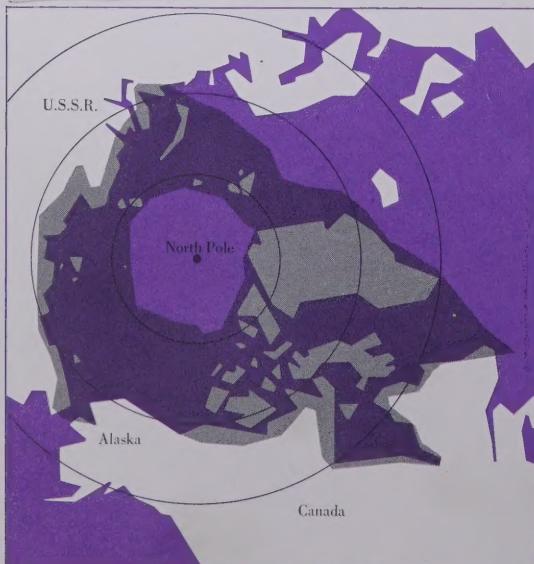


Under a rising spring sun, polar bears, with their massive waddling bodies and long necks, appear lemon yellow against the dazzling whiteness of their home – the coastal pack ice. Moving steadily to leeward of broken lines of ice, they sniff continually, sensitive noses twitching, constantly testing the air for scent from seal dens. Seals are their main prey, and they hunt them all over the Arctic – off the Alaskan coast, among the Canadian Arctic islands, near Greenland, and along islands off the north coast of the Soviet Union.

#### *Physical characteristics*

In size and weight the largest polar bears differ little from the largest brown bears. Adult males (boars) measure from eight to eleven feet in total length, and may weight over 1,000 pounds. They do not approach their maximum size until their eighth to tenth year. Adult females (sows) apparently grow little after their fourth year and usually weigh about 500 pounds. Young bears (born in late November or early December) weigh about 130-180 pounds by their first August and about 250-300 pounds a year later, when they reach approximately five feet in length.

Comparing polar bears to brown bears, we find that the bodies of polar bears are less squat and more elongated; their necks and skulls are also longer. In fact, the brain case of a polar bear is much longer than its facial region. Instead of having the characteristic "dished" profile of the brown bears, polar bears possess more of a "Roman nose". Furthermore, their cheek teeth are comparatively small, while their piercing canine teeth are more pronounced. They have longer tails than brown bears, but their ears are shorter. Polar bear claws are brownish in colour, strong, and less curved than those of brown bears. Their hair is thick, dense (except during the summer moult), and sometimes shorter than in brown bears. It varies in colour from almost pure white in winter to a yellow wash, or almost golden colour, in summer and autumn.



#### *Adaptations to the Arctic*

Polar bears are well adapted to their arctic surroundings. Their thick winter coats, with glossy guard hairs and dense underfur, and the thick fat layers beneath their skin, protect them against cold air and winter. The guard hairs shed water easily, and after a swim bears usually shake themselves like dogs to decrease chilling. The whiteness of polar bear hair may decrease heat loss, although there is no evidence for this; it also serves as camouflage, resulting in more efficient hunting. There are reliable accounts of polar bears covering their black noses with a paw when hunting seals on the ice. The short, furry ears are highly vascularized – that is, they contain a heavy network of blood vessels which keeps the ears warm. Even the soles of their feet are commonly bordered with dense fur to insulate them.

Polar bear teeth show an interesting and important adaptation to environment. There has obviously been a specialization from a formerly omnivorous diet (plants and animals) back to a more carnivorous one (seals). The grinding surfaces of the cheek teeth have become more jagged, and the piercing and shredding canine teeth have become more prominent.

#### *Physical capabilities*

Hunting bears rely mainly on their keen sense of smell, which may lead them to food many miles away, and they have little trouble sniffing out seal dens covered by layers of ice and snow three feet or more thick. Little is known about how well they can see and hear.

Polar bears have great strength and endurance. Their normal gait is a slow, distance-devouring walk, but they may gallop when hunted. Although immature bears can run rapidly for many miles, older bears seem to tire quickly. A bear's speed over the pack ice has been recorded at from 12 to 18 miles per hour, and their maximum speed may be slightly higher. Their ability to scale very rough ice ridges and steep slopes with apparent ease and their clever use of cover, be it land, water, or pushed-up ice, promote their survival by aiding their hunting or their escape from man. Their swimming ability also helps them to escape from hunters, as well as to approach their prey, the seals. Using their large paws as powerful oars, they can sometimes reach a speed of about six miles per hour at the surface. Under water they normally keep their eyes open and their nostrils closed; and it is claimed that they can remain under water for two minutes.

#### *Habitat and distribution*

Polar bears prefer areas with suitable combinations of pack ice (a hunting platform and protective cover), open water (where seals are able to reach the surface and are often abundant), and land (for denning, cover, and supplementary food supplies when seals are not available or when plant food is required). They are maritime rather

need or desire for plant food. Reginald Koettlitz, a medical doctor and explorer, once observed that a polar bear, directly after feeding on a seal, travelled three miles to obtain grass, which it ate abundantly. The items that polar bears have eaten since European man began to penetrate the Arctic are amazing in their variety: bacon, cheese, tea, apples, engine oil, flour, raisins, biscuits, rope, canvas, cardboard, etc.

In extreme cases polar bears will kill men – but there are few documented cases. They will not usually attack a man unless they are protecting cubs or provoked by hunger or wounds.

*Breaking up of the family* – The mother apparently abandon their cubs in late summer or autumn when they are approaching two years of age. At this stage they are likely to be extremely vulnerable; they may starve during the winter or be killed by humans or older bears.

*Longevity* – Little is known about the life span of polar bears, but in captivity they may live to over 30 years of age. From the appearance of some skulls, and the degree of tooth wear, it seems possible that some bears attain similar ages in the wild.

#### *Evolution and history*

Despite a number of obvious differences between brown bears (*Ursus arctos*) and polar bears (*Ursus maritimus*), anatomical and fossil evidence indicate that both species stem from a common ancestor – the Pleistocene bear (*Ursus etruscus*). The polar bear is thus a fairly recent carnivorous offshoot of the brown bear, and is specialized for arctic survival. Indeed, the absence of polar bear fossils in deposits pre-dating the last glaciation suggests the species evolved very rapidly. Fossils are known from Kew Bridge, England; Hamburg, Germany; and Hjørring, Denmark. Polar bears probably evolved in Eurasia and spread from there.

They were evidently known by the Romans about 57 A.D. And, according to translations of the Japanese Imperial Records (*Nihongi*), polar bears were known in Japan and Manchuria as early as 658 A.D. The earliest North European record of polar bears is of the transfer of two captured cubs from Iceland to Norway about 880 A.D.

Captain Phipps in his publication of 1774, *A Voyage towards the North Pole*, was the first to mention the polar bear as a distinct species using the genus and species method of naming animals laid down by Linnaeus. He called the bear *Ursus maritimus*, and this is still its most appropriate scientific name. References in scientific literature to the polar bear as belonging to a distinct genus, *Thalarctos*, do not seem to be justified because of frequently successful breeding between brown bears (*Ursus arctos*) and polar bears in captivity, and their serological (blood serum) and chromosomal (genetic) similarities.

#### *Population*

Walruses and wolves have been known to kill polar bears, but documented cases are rare. Cannibalism is not uncommon among polar bears; adult males sometimes kill cubs. However, man is the primary predator of the polar bear. Depletions of polar bears by successive waves of arctic explorers, whalers, sealers, and fur traders since the early 17th century have caused concern for their survival. Further significant reductions of bears have occurred in the Soviet Arctic and in Greenland since the 1930's, due to overhunting and a gradual warming of the climate and ocean currents, which has caused the melting of pack ice and, in turn, the replacement of seals by fish. Needless slaughters which take place occasionally must be stopped. Polar bears, once fairly secure in their arctic vastness – protected by the natural barrier of severe environment and the technical barriers of poor human transportation and weapons – now face an increasing threat from hunters equipped with aircraft or motor toboggans.

Informed guesses place the world polar bear population at over 10,000 and the Canadian population at about 6,000. The total annual kill of polar bears in 1964 was approximately 1,300. The kill in Canada has approached 600 a year. The Northwest Territories has recently established an annual quota of 383. In addition, about 50 are taken yearly in the Yukon Territory, Ontario, Manitoba, Quebec, and Newfoundland-Labrador.

#### *Economic value*

Economically, polar bears are valuable for a number of reasons, but mainly for their skins. Some prime raw pelts sell for \$450, and Eskimo income from sale of bear hides – luxury items used as rugs or wall hangings – is often substantial. Canadian polar bear fur production was valued at \$81,500 in the 1965-66 fur season (July 1 to June 30). The revenue is particularly valuable to northern natives during poor trapping periods. Pelts are also useful for clothing, and bear meat may be eaten by humans or used as dog food. As infected meat can cause trichinosis, it should be boiled thoroughly before being eaten. Polar bear liver may be dangerous to men and dogs because of its high vitamin A concentrations. Polar bears are also highly valued as display animals, and capturing them for that purpose can be profitable in some countries.

#### *Conservation*

To manage polar bears properly we need better information on population size, growth rates, reproduction rates, and movements. In 1961 the Canadian Wildlife Service began a polar bear study which is still going on. Population estimates are being made from aerial surveys, den counts, and track counts. To gain a better knowledge of polar bear movements, the animals are

being marked with ear tags, dyes, and collars containing tiny radio transmitters. To mark them, biologists must first catch the bears in foot snares and immobilize them with darts loaded with drugs. The darts are shot from special guns and they inject upon impact. The bears are not harmed by the experience.

Although polar bears are not in immediate danger of extinction, there is no room for complacency. Because polar bears wander over the entire Arctic coast, management requires international co-operation. At the First International Scientific Meeting on the Polar Bear at Fairbanks, Alaska, in September 1965, the governments of Canada, Greenland, Norway, the Soviet Union, and the United States expressed their concern about maintaining this valuable and impressive wildlife species.

#### *Reading list*

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#### *How does the Canadian Wildlife Service fit into the national wildlife picture?*

The Canadian Wildlife Service, a branch of the Department of Indian Affairs and Northern Development, conducts wildlife research and management for the federal government. Each province controls the natural resources, including wildlife, within its boundaries. However, because of the Migratory Birds Treaty, signed in 1916 with the U.S.A., the federal government is responsible for management and protection of migratory birds. CWS administers the Migratory Birds Convention Act and Regulations but co-operates with provincial governments in doing so.

CWS studies migratory birds throughout Canada and conducts scientific research into other wildlife problems in the Northwest Territories, the Yukon Territory and the national parks. Since the institution of the National Wildlife Policy and Program in April 1966, it has been co-operating with provincial game agencies and other organizations in research and management.

The CWS staff includes mammalogists, ornithologists, limnologists, pathologists, a biometrist and a pesticides unit. The head office is in Ottawa; regional offices are located in Edmonton and Ottawa, with smaller offices across Canada, from Whitehorse, Yukon Territory, to St. John's, Newfoundland.

CWS administers over 90 migratory bird sanctuaries throughout Canada and it is participating with the provinces in a major program for preserving, by purchase and long-term lease, wetlands necessary to migratory birds for breeding and for resting during migration.

For further information on wildlife in your province, please contact the director of your provincial fish and wildlife department.

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than marine mammals, and are best considered natives of the arctic sea coast. Although seals are usually present wherever there are bears, bears are not found everywhere that seals occur.

Toward the end of the last glaciation (about 80,000 years ago) polar bears lived south of their present range (e.g. southern England, Germany, Denmark). Von Siebold, a German naturalist, reported that polar bears reached the northern island of Japan in 1690, and they were once more common in the Bering Strait and Iceland than they are now. Bears occasionally appear as far south as Newfoundland, the Gulf of St. Lawrence, Iceland, and northern Scandinavia (Finnmark) due to extraordinarily strong southerly circulations of ice-filled arctic water. They have been known to penetrate 100 miles or more inland in Canada, Alaska, and the Soviet Union. They rarely appear in the zone of permanent north polar ice, but have been recorded as far north as 88° north latitude. Polar bears are most abundant in a circumpolar belt of seasonally broken ice, and their range centres about the denning areas.

Important denning areas are Melville Bay and Kane Basin in northwestern Greenland, and the eastern coast of Greenland; the east coast of West Spitsbergen, Edgeøya, and Kong Karls Land in the Norwegian Arctic; Franz Josef Land and Wrangel Island in the Soviet Arctic; and southern Banks Island, Simpson Peninsula, eastern Southampton Island, and eastern Baffin Island in the Canadian Arctic. No major denning areas seem to exist in Alaska, but polar bears may den occasionally in the vicinity of its northern and northwestern coasts.

#### *Life history*

**The dens** — Although polar bears of both sexes and various ages occupy dens, pregnant females are most regular in this habit, usually denning from October to April. Denning begins about October, when the pregnant females search for deep snowdrifts near the coast. Very often they excavate their dens on south-facing slopes of hills or valleys, where prevailing northerly winds pile up thick snowbanks. Dens vary in size, but may be as large as 8 feet x 10 feet x 4 feet high, and, when occupied, the inside temperature can be about 40° F warmer than the outside air temperature. The young are born in late November or early December — usually twins, sometimes a single cub, rarely triplets, and extremely rarely quadruplets. At birth the cubs are only about 10 inches long and weigh little more than 1½ pounds. They are blind and deaf, and cannot see or hear well until a month or more after birth.

**Spring hunting** — Most family groups leave their dens about the third week in March, after a short period in which the mothers feed on local vegetation and exercise themselves and their cubs in the surrounding area. On the journey down to the sea ice, the females may stop two or three times a day to rest, feed the cubs, and play with them.

They often choose resting spots in the snow which are sheltered from prevailing winds by large rocks, against which they can recline, and where they get a good view of the surrounding country.

During April and May the young cubs follow their mothers closely while they hunt for seal dens. The young seals, or "whitecoats", found in the dens probably constitute the greatest part of the bears' diet in spring. After smashing in the dens and scooping out their prizes, the mothers kill the seals quickly, gulping down fat and skin which they strip from the carcasses, in order to nourish themselves, and indirectly the cubs through their milk. Generally bears eat little seal meat.

**Reproduction** — Mating usually occurs in April when polar bears are out on the pack ice hunting whitecoats. The gestation period lasts about eight months, and although there is no scientific proof yet, there is good reason to believe that embryonic development is delayed until late September or early October. Females probably become sexually mature when they are three years old, males when they are four. Adult females can bring forth cubs the third winter after a previous birth, or sooner if the cubs die or are lost. This apparently accounts in part for the rather slow rate at which depleted populations may revive.

**Hunting and feeding habits** — Although lactation may continue for 21 months, the cubs are generally weaned by July of their first year, when they have acquired a taste for seal blood and fat. As the summer progresses, the bears hunt at the seal holes where they wait patiently. When the ice begins to drift apart they sometimes stalk seals basking on land-fast ice or ice pans by silently crawling, or swimming up and pouncing on them. They feed most heavily on ringed seals, but also other species such as harp, bladdernose, and occasionally bearded seals. Very rarely they may kill walruses, white whales, and narwhales. They are by no means always successful in their hunting.

By August or September, when much of the pack ice has drifted ashore or melted, the bears often begin to patrol coastal areas for washed-up seal, whale, or walrus carcasses. When confined to land they may feed on lemmings if they are abundant. Only a few cases are known of bears killing and eating caribou and muskoxen. Arctic hares and foxes are generally too fleet-footed. But when food is scarce, foxes caught in traps set by northern natives are often devoured by bears. In the Norwegian Arctic, ptarmigan baits for fox traps are also eaten. The bears sometimes feed on sea-birds (e.g. eider ducks), their young, or their eggs. They have also been reported to eat fish.

Another common food item during the late summer is vegetation — seaweed, lichens, mosses, mountain sorrel, sedges, and grasses. Bears have even been seen diving for seaweed in winter in the Norwegian Arctic. They seem to be very fond of crowberries, bilberries, and cranberries, where they are available, and sometimes show a definite



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